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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,061	02/22/2006	Hajime Harada	5404/111	1320
757 7590 11/01/2007 BRINKS HOFER GILSON & LIONE P.O. BOX 10395 CHICAGO, IL 60610			EXAMINER REDDY, KARUNA P	
			ART UNIT 1796	PAPER NUMBER
			MAIL DATE 11/01/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/540,061	Applicant(s) HARADA ET AL.	
	Examiner Karuna P. Reddy	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 10-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 10-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/18/2007 has been entered.
2. Claims 8-9 are cancelled and new claim 18 is added. Claims 1-7 and 9-18 are currently pending in the application.
3. Texts of those sections of Title 35 U.S. Code not included in this action can be found in a prior office action and incorporated here by reference.

Claim Rejections - 35 USC § 103

4. Claims 1-7 and 10-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa et al (WO 99/43719, hereafter Nakagawa et al '719) in view of Sugioka et al (JP 10-007919).

It is noted that WO 99/43719 (WO) is being utilized for date purposes.

However, since WO is not in English, in the discussion below the US equivalent

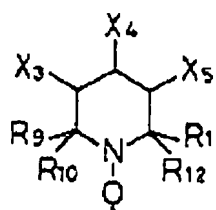
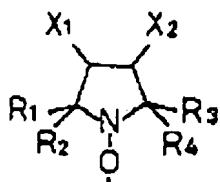
for WO, namely, Nakagawa et al (US 6, 964, 999) is referred to in the body of the rejection below. All column and line citations are to the US equivalent.

Nakagawa et al '719 discloses a process of making vinyl polymer having at least one terminal (meth)acryloyl group of the general formula – OC(O)C(R)=CH_2 per molecule (column 3, lines 51-55). In the vinyl polymer with at least one terminal (meth)acryloyl group of the general formula – OC(O)C(R)=CH_2 per molecule, R represents H or an organic group containing 1 to 20 carbon atoms (column 3, lines 51-58). More preferably are –H and –CH₃ (column 4, lines 18-24). Examples of monomers to form the main chain of vinyl polymer include (meth)acrylic monomers, styrene monomers (column 4, lines 34, 57). Styrene and (meth)acrylic monomers are preferred. More preferred are acrylic ester and (meth)acrylic ester monomers (column 5, lines 13-15). The polymer is prepared by living radical polymerization or by radical polymerization using a chain transfer agent (column 5, lines 4-46). The atom transfer radical polymerization is a still more preferred mode of living radical polymerization (column 8, lines 38-40). The transition metal complex for use in the atom transfer radical polymerization includes a metal complex the central metal of which is selected from among the elements belonging to group 7, 8, 9, 10 or 11. More preferably the central metal of the transition metal complex is zero-valent copper, monovalent copper, divalent ruthenium, divalent iron and divalent nickel. Copper complexes are especially preferred (column 14, lines 50-58).

The vinyl polymer is obtained by reacting an olefin polymer having a terminal structure of the general formula $-\text{CR}^1\text{R}^2\text{X}$ (wherein R^1 and R^2 represent a group attached to the ethylenically unsaturated group of a vinyl monomer and X represents chloro, bromo or iodo) and with a compound represented by $\text{M}^+\text{OC(O)C(R)=CH}_2$ (wherein R represents hydrogen or an organic group of 1 to 20 carbon atoms and M^+ represents an alkali metal or quaternary ammonium ion) (column 15, lines 35-50). The vinyl polymer is obtained by reacting a hydroxy terminated vinyl polymer with a compound represented by XC(O)C(R)=CH_2 (wherein R represents H or an organic group of 1 to 20 carbon atoms and X represents chloro, bromo, or a hydroxyl group) (column 15, lines 51-57). The vinyl polymer is obtained by reacting a hydroxy-terminated vinyl polymer with a diisocyanate compound and the residual isocyanate group is reacted with a compound represented by $\text{HO-R}'\text{-OC(O)C(R)=CH}_2$ (wherein R represents hydrogen or an organic group having 1 to 20 carbon atoms and R' represents a bivalent organic group of 2 to 20 carbon atoms) (column 15, lines 58-67). The number average molecular weight of vinyl polymer is preferably 500 to 100000 (column 5, lines 32-34). The vinyl polymer preferably has a molecular weight distribution i.e. the ratio of weight average molecular weight to number average molecular weight of less than 1.8 (column 5, lines 20-23).

Nakagawa et al '719 is silent with respect to, reacting the vinyl polymer obtained by ATRP with a group having $\text{C}=\text{C}$ double bond, in the presence of a stable free radical.

However, Sugioka et al teach a process for preparing curable resin by reacting the curable resin-forming component in the presence of a nitroxyl compound (reads on the stable free radical of present claims),



to prevent gelation of the resin and obtain a light colored curable resin (abstract). Therefore, it would have been obvious to one skilled in the art, to add stable free radicals such as nitroxyl compounds, to the reaction system comprising vinyl polymer and a compound containing polymerizable C=C double bond, and obtain a vinyl polymer with polymerizable C=C double bond at the terminus i.e. a curable resin with excellent properties mentioned above.

5. Claims 1-7, 10-11 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa (EP 1 000 954 A1, hereafter Nakagawa '954) in view of Sugioka et al (JP 10-007919).

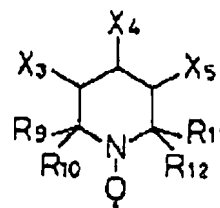
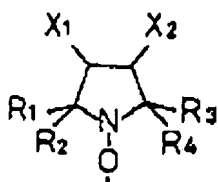
Nakagawa '954 discloses a process for making a stellar polymer, which comprises polymerizing a vinyl monomer in the manner of living polymerization and adding a compound having two or more polymerizable carbon-carbon double bonds at the end point of polymerization (abstract). In this polymerization a nitroxy free radical ($=N-O^{\bullet}$), which is generally stable, is used as the radical capping agent (paragraph 0016). The compound having two or more

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polymerizable C=C bond includes $-\text{OC}(\text{O})\text{C}(\text{R}^6)=\text{CH}_2$ (wherein R^6 is H, Me, CN or a group selected from among organic groups containing 1 to 20 carbon atoms (paragraph 0012, page 4, lines 15-24). Vinyl monomers to be used include (meth)acrylic acid monomers, styrene monomers (paragraph 0043). Most preferred are acrylate ester monomers and methacrylate ester monomers (paragraph 0044). In the present invention, atom transfer polymerization is preferred (paragraph 0016). The transition metal complex to be used as catalyst in the atom transfer radical polymerization include complexes of Cu(0), Cu(I), Ru(II), Fe(II) or Ni(II) (paragraph 0024). The polymer has a narrow molecular weight distribution, namely narrow (M_w/M_n) ratio and preferably not more than 1.8 (paragraph 0056). See examples 1-3 where in the molecular weight of stellar polymer is greater than 2000.

Nakagawa '954 is silent with respect to, reacting the vinyl polymer obtained by ATRP with a group having C=C double bond, in the presence of a stable free radical.

However, Sugioka et al teach a process for preparing curable resin by reacting the curable resin forming component in the presence of a nitroxyl compound (reads on the stable free radical of present claims),



to prevent gelation of the resin and obtain a light colored curable resin (abstract). Therefore, it would have been obvious to one skilled in the art, to add stable free radicals such as nitroxyl compounds, to the reaction system comprising vinyl polymer and a compound containing polymerizable C=C double bond, and obtain a vinyl polymer with polymerizable C=C double bond at the terminus i.e. a curable resin with excellent properties mentioned above.

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa (EP 1 000 954 A1, hereafter Nakagawa '954) in view of Sugioka et al (JP 10-007919) and Nakagawa et al (WO-99/43719, hereafter Nakagawa et al '719).

It is noted that WO 99/43719 (WO) is being utilized for date purposes. However, since WO is not in English, in the discussion below the US equivalent for WO, namely, Nakagawa et al (US 6, 964, 999, hereafter Nakagawa et al '999) is referred to in the body of the rejection below. All column and line citations are to the US equivalent.

The discussion with respect to Nakagawa '954 in view of Sugioka et al in paragraph 5 is incorporated herein by reference.

Nakagawa '954 in view of Sugioka et al is silent with respect to the use of chain transfer agent during radical polymerization.

However, Nakagawa et al '999 has shown that vinyl polymers can be produced by radical polymerization using a chain transfer agent (column 5, 44-

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46). In the chain transfer method, polymerization reaction is conducted using a chain transfer agent having a defined functional group to give a vinyl polymer having the functional group (column 6, lines 7). Therefore, it would have been obvious to one skilled in the art at the time invention was made to polymerize vinyl monomer using chain transfer agent because Nakagawa et al '999 have proven successfully the polymerization of vinyl monomer using a chain transfer agent and one of ordinary skill in the art would have expected the process to work for the polymerization of vinyl monomer of Nakagawa '954, motivated by expectation of success.

Response to Arguments

7. Applicant's arguments filed 10/18/2007 with respect to rejection of claims 1-17 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karuna P. Reddy whose telephone number is (571) 272-6566.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119.

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The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Karuna P Reddy
Examiner
Art Unit 1796

/KR/

/Vasu Jagannathan/
Supervisory Patent Examiner
Technology Center 1700